## REMARKS

These remarks are in response to the Final Office Action mailed October 26, 2005. No new matter is believed to have been introduced.

## The Invention

The invention is directed to the use of a plurality of differentially responsive sensors to determine an analyte's activity, chemical or physical property, or function. For example, a plurality of different differentially responsive sensors (see, e.g., paragraph 0016) generates a measurable signal that is detected by a measuring device. For example, mass uptake can be measured by acoustical devices (e.g., vibration will change depending upon mass uptake). The measuring device detects a signal from each of the plurality of different differentially responsive sensors when the sensor array is contacted with the analyte of interest. The sensor arrays need not be specially designed to include sensors that probe any specific "functional group", but a rather comprise a plurality of different sensors that probe a plurality of different groups (e.g., alcohols – chemiresistive sensors), mass uptakes (e.g., SAW sensors), properties (e.g., chirality) etc. A computer comprising instructions on a computer readable program for causing the computer to assemble the signals from each of the sensors in the array into a sensor array signal profile is used to compare the sensor array signal profile to the plurality of previously obtained signal profiles from a plurality of standard samples not including the analyte of interest. The comparison then identifies the activity, chemical or physical property, or function of at least one known analyte that most closely correlates with the sensor array signal profile, such that the correlation of the sensor array signal profiles to the previously obtained signal profiles is predictive of a specific activity, chemical or

physical property, or function of the analyte of interest. Thus, suggesting a potential activity, chemical or physical property, or function of the analyte of interest. Such a system is useful to rapidly narrow chemical candidates in a library for further research.

## I. REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH

Claims 9-16 stand rejected under 35 U.S.C. §112, first paragraph because the specification, while being enabling for predicting the inhibitory action of alcohols on cytochrome P-450 aniline p-hydroxylation and perhaps some other properties of alcohols or simple organic molecules, such as vapor pressure, allegedly does not reasonably provide enablement for predicting or determining the specific activity, chemical or physical property or function of compounds other than alcohols. Applicants respectfully traverse this rejection.

In the Office Action at page 2-3 the Examiner alleges that there is no support in Applicants' specification to support the array exemplified in the prior response. First, the Examiner alleges that the sensor array described in the prior response comprises sensors that are each specific to a certain functional group (see, e.g., the Office Action at page 3). Applicants submit that the response states, "***For example***, a sensor array comprising 5 sensors ***may include*** a first sensor...." In other words, the sensor array can include (i.e., open ended) other sensors.

Second, the Examiner alleges that the sensor array described in the prior response is contrary to the disclosure (see, page 3 of the Office Action). Applicants respectfully disagree. It appears the Examiner is concerned with the term "measurable signal" or "measurable change". The absence of a change is a

measurable event (i.e., the lack of a change can be measured). Thus, Applicants submit that the described array clearly indicates that sensors in the array can provide a signal that is measurable either by changing or not changing.

Applicants submit that the description (i.e., the species of array) set forth in the prior response was used for illustrative purposes. Applicants submit that the exemplified array described in the prior response is fully supported by the specification including the paragraphs cited from Applicants specification at page 3 of the Office Action.

Third, the Office Action alleges that Applicants have not distinguished how mechanical or magnetic sensors can be used to distinguish a hydrocarbon functional group from an alcohol group (see, last paragraph at page 3 of the Office Action). Applicants submit that the mechanical and magnetic elements refer to transduction methods. As the Examiner recognizes and agrees at page 6 of the Office Action, numerous sensor modalities are available.

Finally, the Office Action alleges that it is not just the composition that determines the function, property and/or activity of an analyte, but also its sequence and higher order structure. Applicants respectfully submit that the specification clearly indicates that a plurality of differentially responsive sensors are used to probe various aspects of the analyte, which can comprise mass uptake (via SAW sensors), chemical side groups (via chemiresistors), chirality (via chemiresistors), particular epitopes (via optical antibody based sensors) and the like. Again, Applicants submit that the Patent Office appears to be attempting to narrow Applicants' claimed invention based upon exemplary aspect in view of a broader disclosure, this is improper. Attached hereto is an example of a peer reviewed journal article that

demonstrates a combination of mass detection with DNA detection to characterize a sample (see, Appendix B).

At page 4, bridging to page 5 of the Office Action, the Examiner invites Applicants to provide examples of protein-function-prediction available in the art using sensors. Applicants respectfully submit that what the Examiner is asking for is *the invention*. Applicants direct the Examiner to the National Center for Biotechnology Information (NCBI), which is associated with the National Library of Medicine (NLM) and National Institutes of Health (NIH). The web page includes the Basic Local Alignment Search Tool (BLAST; Altschul et al., Nuc. Acids Res. 25:3389-3402 (1977) and Altschul et al., J. Mol. Biol. 215:403-410 (1990)), which finds regions of local similarity between sequences. The program compares nucleotide or protein sequences to sequence databases and calculates the statistical significance of matches. *BLAST can be used to infer functional and evolutionary relationships between sequences as well as help identify members of gene families.* In other words, function prediction using BLAST is based upon sequence alignment. The present invention utilizes a similar functional prediction based upon sensor fingerprints as compared to sequence fingerprints.

The Office Action further alleges at page 5, third paragraph to page 6, that Applicants mistakenly make an assumption about transduction modalities and sensor compositions that is inaccurate. Applicants direct the Examiner to Appendix A, reference Penza et al. (abstract), which teaches that different materials can be substituted onto different sensing modalities (i.e., quartz crystal microbalance and optical fibre sensors). If the Examiner has suggestions on phrasing (e.g., "optical sensors comprising an optical transduction modality...), the Applicants are open to

the Examiner's suggestions. Applicants submit, however, that such technical features are inherent and understood by one of skill in the art, and more than one material can be used in more than one sensing modality.

It appears to Applicants (based upon the cited quotation at page 6), that the Patent Office is trying to limit Applicants to the specific exemplary process and materials in view of a broader disclosure, this is improper. The Examiner is referred to page 6, paragraph [0016] of the specification wherein Applicants set forth examples of differentially responsive sensors, which goes beyond the polymers and electrical modalities described in the specific examples of the disclosure. This is further discussed in the §112 rejection below.

Claims 9-16 stand rejected under 35 U.S.C. §112, first paragraph, because the specification, while being enabling for predicting the inhibitory action of alcohols on cytochrome P-450 aniline p-hydroxylation and perhaps some other properties of alcohols or simple organic molecules, such as vapor pressure, allegedly does not reasonably provide enablement for predicting or determining the specific activity, chemical or physical property, or function of compounds other than alcohols. Applicants respectfully traverse this rejection.

The Office Action alleges that claim 16 is unbounded by the type of analyte that can be determined by the methods, devices and systems of the invention. Furthermore, the Office Action alleges that the sensor array is unbounded as to the type of sensors (see, e.g., the Office Action at page 8).

Applicants respectfully submit that a patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d

1331, 1332 (Fed. Cir. 1991); *Spectra Physics, Inc. v. Coherent, Inc.*, 827 F.2d 1524, 3 USPQ2d 1737 (Fed. Cir. 1987); *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947 (1987); and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984). All that is necessary is that one skilled in the art be able to practice the claimed invention, given the level of knowledge and skill in the art. The Examiner has acknowledged that the Applicants have demonstrated alcohol and numerous other chemical entities can be sensed and analyzed by the invention. The Examiner has further acknowledged that numerous sensor types and sensing modalities are known in the art (see, e.g., paragraph 0016 of the specification and page 6, last paragraph of the Final Office Action). In addition, Applicants attach hereto (as Appendix B) a reference by Drummond et al. ("Electrochemical DNA Sensors, Nature Biotechnology, 21(10):1192-1199 (2003)) as an example of DNA biosensors that use electronic readout/signal transduction (see, e.g., Figures 1 and 2). In addition, the reference teaches that combinations of sensor types that measure mass along with hybridization are useful for DNA identification (see, e.g., pg. 1193).

Thus, the methods, devices and systems of the invention are capable of recognizing properties of alcohols or simple organic molecules as recognized by the Examiner at page 7 of the Final Office Action. Furthermore, the remarks above demonstrate the combination of sensor modalities utilizing similar polymers to detect analytes, the use of a combination of mass sensing with electrochemical sensors to detect and characterize DNA. The references demonstrate that one of skill in the art would be capable of practicing the invention without undue experimentation. Again,

it appears that the Examiner is attempting to limit Applicants to the specific example provided in the specification in view of a broader disclosure.

Based upon the foregoing remarks and the attached references, Applicants submit that the scope of the claims is enabled to one of skill in the art. Accordingly, Applicants respectfully request withdrawal of the rejection.

## II. REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH

Claims 9-16 stand rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Office Action requests clarification whether the analytes of original claims 4-7 fall within the scope of claim 16.

Applicants respectfully submit that a number of molecules comprise an alkane, alkene, alkyne, diene, alicyclic hydrocarbon, arene, alcohol, ethers, ketones, aldehydes, cyclic hydrocarbons, carbonyls, carbanions, polynuclear aromatics and/or halide derivatives. Furthermore, the invention demonstrates the detection of such compounds (see, e.g., the specific examples of the specification and Severin et al.). Accordingly, Applicants respectfully request withdrawal of the rejection.

## III. INFORMATION DISCLOSURE STATEMENT

Applicants provide a copy of the Toppare article as requested by the Examiner (see Appendix C).

Please charge any required fee for consideration of this response or credit any overpayment to Deposit Account No. 02-4800, referencing the Attorney Docket No. above.

Respectfully submitted,

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